

WETLAND MITIGATION SITE MONITORING REPORT

FAP 310 (US 67) Mercer County

Introduction

This report details monitoring of the wetland mitigation site created to compensate for impact to wetlands by construction on FAP 310 (US 67) in Mercer County. The site consists of approximately 0.69 ha (1.7 ac) of wetland creation (Site 1) and 0.28 ha (0.7 ac) of wetland restoration (Site 2). The wetland creation is located in the southeast quarter of the intersection of U S Route 67 and the Edwards River; the restoration is located in the northeast quarter. The legal location is NE 1/4, SW 1/4, Section 35, T. 15 N., R. 2 W. The Illinois Department of Transportation (IDOT) completed construction of the site on 12 August 1997. Trees were planted during the fall of 1998 (T. Brooks, IDOT Wetlands Unit, memo to Allen Plocher, 10 February 1999). The second year of onsite monitoring was conducted on 16 August 2000.

This report discusses the goals, objectives, and performance criteria for the mitigation project, the methods used for monitoring the site, monitoring results, and a discussion and recommendations based on the results. Methods and results are discussed by performance criteria for each goal.

Goals, Objectives, and Performance Standards

Goals, objectives, and performance standards follow those specified in the monitoring plan (T. Brooks, IDOT Wetlands Unit, 1999) and the wetland compensation plan (C. Perino, IDOT Wetlands Unit, 1996) developed for this site. Performance criteria are based on those specified in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and in *Guidelines for Developing Mitigation Proposals* (USACE 1993). Each goal should be attained by the end of the 5-year monitoring period. Goals, objectives, and performance criteria are listed below.

Project goal 1: The created wetland community should be a jurisdictional wetland as defined by current federal standards.

Objective: The created wetland should compensate for the loss of 0.31 ha (0.76 ac) of floodplain forest and 0.09 ha (0.23 ac) of emergent wetland at a 1.5:1 ratio.

Performance criteria:

- a. Predominance of hydrophytic vegetation: More than 50% of the dominant plant species must be hydrophytic.
- b. Presence of wetland hydrology: The area must be either permanently or periodically inundated at average depths less than 2 m (6.6 ft) or have soils that are saturated to the surface for at least 12.5% of the growing season.
- c. Occurrence of hydric soils: Hydric soil characteristics should be present, or conditions favorable for hydric soil formation should persist at the site.

Project goal 2: The created wetland plant community should meet standards for floristic composition and vegetation cover.

Objectives: A floodplain forest will be created by planting native woody species. Herbaceous vegetation will be allowed to colonize the site naturally.

Performance criteria:

- a. Establishment of tree seedlings: Planted or volunteer tree seedlings should be established at each site.
- b. Floristic Quality Assessment: The floristic quality index (FQI) and mean coefficient of conservatism (\bar{c}) for both sites should meet or exceed the FQI and \bar{c} values of the filled wetlands, 7.0 and 2.0, respectively.
- c. Dominance of vegetation: None of the three most dominant plant species in either site may be non-native species, cattails (*Typha* sp.), or reed canary grass (*Phalaris arundinacea*).

Project goal 3: The created wetland should function to remove sediments from the floodwaters of the Edwards River.

Objectives: The wetland creation site should retain floodwater and allow sediments to settle out of suspension.

Performance criteria:

- a. Sediment removal: Sediments in the wetland should accumulate at a rate of 0.3 to 1.1 in/yr.

Methods

Project goal 1

a. Predominance of hydrophytic vegetation

The method for determining dominant vegetation at a wetland site is described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and further explained in the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (Federal Interagency Committee for Wetland Delineation 1989). It is based on aerial coverage estimates for individual plant species. Each of the dominant plant species is then assigned its wetland indicator status rating (Reed 1988). Any plant rated facultative or wetter, i.e., FAC, FAC+, FACW, and OBL, is considered a hydrophyte. A predominance of vegetation in the wetland plant community exists if more than 50% of the dominant species present are hydrophytic.

b. Presence of wetland hydrology

Illinois State Geological Survey (ISGS) personnel installed seven ground water monitoring wells and one stage gauge at the site in 1999. Locations for these sites can be found in the ISGS report *Edwards River/Mercer County Wetland Compensation Site* (Miner 1999). Water-level data was collected monthly throughout the year and biweekly during April and

May. Methods are further described in the ISGS document *Annual Water-level Report for Active IDOT Sites* (Fucciolo et al. 1999).

c. Occurrence of hydric soils

The soil was sampled in order to monitor hydric soil development. Soil profile morphology including horizon color, texture, and structure was described at various points throughout the site. Additionally, the presence, type, size, and abundance of redoximorphic features were noted.

Hydric soils typically develop slowly, and characteristics may not be apparent during the first several years after project construction. In the absence of hydric soils indicators at the end of the five-year monitoring period, hydrologic data could be used as corroborative evidence that conditions favorable for hydric soil formation persist at the site.

Project goal 2

a. Establishment of tree seedlings

In order to create and restore floodplain forest, tree seedlings were planted at both compensation sites. According to the tasking order for this project (T. Brooks, IDOT Wetlands Unit, memo to Allen Plocher, 10 February 1999), the following number of trees were planted at the sites in Fall 1998:

Table 1. Species planted in the created wetland (Site 1).

Species	Common Name	Number
<i>Acer rubrum</i>	red maple	60
<i>Betula nigra</i>	river birch	60
<i>Quercus bicolor</i>	swamp white oak	60
<i>Quercus palustris</i>	pin oak	60

Table 2. Species planted in the restored wetland (Site 2).

Species	Common Name	Number
<i>Acer rubrum</i>	red maple	25
<i>Betula nigra</i>	river birch	25
<i>Quercus bicolor</i>	swamp white oak	25
<i>Quercus palustris</i>	pin oak	25

Survivorship and density of planted trees was determined by censusing. All live planted trees were counted for both the created and restored wetlands. Volunteer seedlings were designated as occasional or abundant by species.

Density of live planted trees is given as the number of live planted trees/100 m² for each site. Survival was calculated as a percentage of the number of expected live individuals: (Total number of live planted trees/the number of known planted trees) x 100.

b. Floristic Quality Assessment

The Floristic Quality Assessment (Taft et al. 1997) was applied to the plant community at the site to evaluate floristic quality and nativity. The assessment methodology is used to identify natural areas and facilitate floristic comparisons among sites. This technique is part of the procedure for the long-term monitoring of natural areas and the monitoring of restored or created wetlands (Swink and Wilhelm 1994). The premise of the method is that each native or adventive (but not introduced) plant species is assigned a conservatism coefficient (C) ranging from 0 to 10. Individual conservatism coefficients are ranks of species behavior and reflect the committee's (Taft et al. 1997) confidence level for a taxon's correspondence to anthropogenic disturbances. Coefficient values range from 0 to 10, with all adventive species given a coefficient of 0. Plant species assigned 0 have low affinities for natural areas, whereas those assigned 10 have very high affinities. When a complete species list is assembled for a wetland site, the overall average conservatism coefficient (\bar{C}) and a site floristic quality index (FQI) can be calculated. These values provide a measure of site floristic quality. Floristic quality index values (FQI values) less than 5 indicate that the area is extremely weedy or in an early successional stage (Swink and Wilhelm 1994). FQI values greater between 20 and 35 ($\bar{C} = 3.0$) indicate that the area has evidence of native character and can be considered a botanical asset. FQI values between 35 and 50 ($\bar{C} = 3.5$) indicate that the area has significant native character.

c. Dominance of vegetation

Plant species dominance was determined as in project goal 1, a. Predominance of hydrophytic vegetation. The method for determining dominant vegetation at a wetland site is described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and further explained in the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (Federal Interagency Committee for Wetland Delineation 1989)

In addition, three permanent photography stations were established so that photographs could be used to document changes in plant community size and composition. The locations of the photo stations are indicated on the enclosed aerial photograph. Arrows indicate the direction in which the photos were taken.

Project goal 3

a. Sediment removal

ISGS personnel installed 12 sediment traps in the wetland creation site in fall 1999. Trap locations are shown on the site map included in Appendix A.

Results

Project goal 1

a. Predominance of hydrophytic vegetation

Dominant plant species for the mitigation sites in 2000 are shown in Table 3 and Table 4. Over 50% of the dominant species at both sites are rated OBL, FACW+, FAC+, or FAC and, therefore, are hydrophytic.

Table 3. Dominant plant species by stratum and wetland indicator status for the created wetland (site 1).

Dominant Plant Species	Stratum	Indicator Status
1. <i>Bidens connata</i>	herb	OBL
2. <i>Leersia oryzoides</i>	herb	OBL

Table 4. Dominant plant species by stratum and wetland indicator status for the restored wetland (site 2).

Dominant Plant Species	Stratum	Indicator Status
1. <i>Aster ontarionis</i>	herb	FAC
2. <i>Bidens connata</i>	herb	OBL
3. <i>Melilotus officinalis</i>	herb	FACU

b. Presence of wetland hydrology

Ground water-level data for the created wetland for September 1999 through August 2000 is presented in Appendix A (Carr and Weaver 2000). Figures showing ground water-level elevations and depth to water (referenced from land surface) are included. According to Carr and Weaver, "no significant portion of the wetland compensation area satisfied wetland hydrology criteria in 2000." Only the water levels measured in well 1S (Figure 3) satisfied the wetland hydrology criteria. No significant area around this well could be included according to adjacent well and stream gauge data (Carr and Weaver 2000).

No monitoring wells were placed in the restored area and no indicators of wetland hydrology were observed. The position of this site between the Edwards River and a levee, suggests that the area floods for some period of time each year. At this time, however, it is uncertain as to whether this site is inundated or saturated for a sufficient duration to satisfy the wetland hydrology criteria.

c. Occurrence of hydric soils

Soils examined at both of the mitigation sites were found to be highly disturbed. Much cutting and filling has been done within the top twenty inches and the sites lack a true undisturbed A horizon.

At the wetland creation site, gravel was found in the upper twenty inches confirming that a roadbed once occurred on the site. Even though the soils are disturbed, hydric soil indicators are present. Following is a soil description of a typical pedon at the site.

Table 5. Description of the soils at the created wetland (site 1).

<u>Depth</u>	<u>Matrix Color</u>	<u>Concrete</u>	<u>Iron Masses</u>	<u>Pore linings</u>	<u>Iron Deplet.</u>	<u>Clay Deplet.</u>	<u>Texture</u>	<u>Structure</u>
0-2 in	10YR 3/1	none	none	none	none	none	Sicl	Gr
2-11 in	10YR 3/1 10YR 3/2	none	mmp 10YR 5/8	none	none	none	Sicl	Sub Bl
11-18 in	10YR 3/1	none	Cfd 10YR 4/4 ffp 7.5YR 4/6	none	none	none	Sicl	Sub Bl
18-27 in	10YR 3/1 10YR 4/1	none	mmd 10YR 5/4	none	none	none	Sicl	Pr
27-35 in	2.5Y 5/1	none	mmd 10YR 5/6	none	none	none	Sicl	Pr

In addition to being disturbed, soils at the restoration site are also compacted and contained much rock and gravel. Soils could not be penetrated more than a couple of inches and so a thorough description was not done and no determination was made concerning the hydric nature of these soils.

Project goal 2

a. Establishment of tree seedlings

Tables 6 and 7 show the results of the censusing of trees at sites 1 and 2. Both volunteer and planted tree seedlings are becoming established at the sites. At the created wetland, a total of 133 trees were counted. No *Acer rubrum* were found at the created wetland site in either 1999 or 2000, therefore, I assumed that the 60 red maples had never been planted and have not included them in these calculations. I calculated that out of the 180 planted trees, 133 were still alive for a survival rate of approximately 74% and a mean density of 1.9 live planted trees/100 m². Volunteer *Acer sacharinum* seedlings and shrubs were scattered throughout the site. Volunteer *Populus deltoides* shrubs occurred in dense patches in several locations.

A total of 56 live planted trees were present at Site 2 for a survival rate of 56% and density of 2.0 live planted trees/100 m². Only 2 of the 25 red maples reported to have been planted at the site were found this year and last. If red maples are not included in the calculations, the survival rate is 75% and the density is 1.9 live planted trees/100 m². Volunteer seedlings of silver maples and cottonwoods were occasional throughout the site.

Table 6. Tree seedling establishment in the created wetland (site 1).

<u>Species</u>	<u>Number planted</u>	<u>Number surviving</u>	<u>Percent survival</u>
<i>Acer rubrum</i>	60	0	0%
<i>Betula nigra</i>	60	54	90%
<i>Quercus bicolor</i>	60	56	93%
<i>Quercus palustris</i>	60	23	38%

Table 7. Tree seedling establishment in the restored wetland (site 2).

Species	Number planted	Number surviving	Percent survival
<i>Acer rubrum</i>	25	2	8%
<i>Betula nigra</i>	25	22	88%
<i>Quercus bicolor</i>	25	19	76%
<i>Quercus palustris</i>	25	13	52%

b. Floristic Quality Assessment

Two FQI values were calculated for each site from the species lists included in Appendix B. The first FQI value is calculated from only species that became established on the site naturally; the second FQI value includes the planted trees. The created wetland has an FQI value of 12.4 and a \bar{c} of 1.7 when only natural vegetation is included. When the planted trees are added, the FQI value is raised to 14.3 with a \bar{c} value of 1.9. The FQI value for the restored wetland is 15.6 with a \bar{c} value of 2.1 when only naturally established vegetation is considered, and 17.7 and 2.3 when the planted trees are included. In all cases, the FQI values exceed the requirement of 7.0, however, in the created wetland, the \bar{c} values are slightly lower than the required 2.0.

c. Dominance of vegetation

The created wetland site meets the performance criteria for dominance of vegetation. None of the three most dominant species are non-native species, cattails, or reed canary grass. All of the dominant species (Table 3) are native. Cattails occur at the site, but only in small numbers. Reed canary grass also occurs at the site. It is not a dominant, however, the amount of it has increased significantly over the last year and it should be monitored closely.

The restored wetland site does not meet the performance criteria for dominance of vegetation (Table 4). *Melilotus officinalis* (sweet yellow clover), a non-native, is one of the three most dominant species at the site. This species, although undesirable, is not a big cause for concern. It is a biennial, early successional, shade-intolerant species and should disappear from the site as the trees grow and canopy cover increases.

Photographs were taken from the permanent photography stations and are in Appendix C of this report.

Project goal 3

a. Sediment removal

Sediment traps were monitored by ISGS personnel. They reported that "no measurable amounts of sediment were noted in any of the 12 traps deployed on the site, however, a film of sediment was noted inside the collectors" (Carr and Weaver 2000). It is their opinion that water velocity through the site may be too rapid to deposit significant amounts of sediment in the basin.

Discussion

After the second year of monitoring, it is unknown whether the created wetland site will comply with project goals, objectives, and performance standards by the end of the monitoring period. Although the planted trees and other hydrophytic vegetation are becoming established and hydric soil indicators were found, the three criteria for wetland hydrology are not being met. At the restored wetland, planted trees and hydrophytic vegetation are becoming established as well, however, no hydric soil indicators and no signs of wetland hydrology were found.

The dominant vegetation at both sites is hydrophytic. A non-native does occur among the three most dominant species at the restored wetland (site 2). This species is a biennial, weedy, shade-intolerant species and its numbers should decrease as canopy cover increases at the site. Both volunteer and planted tree seedlings are becoming established on the sites. The FQI values are above the required level, however the \bar{c} values are low for the created wetland. This means that there are a large number of species that have very low coefficients of conservatism (C). This is common on disturbed and early successional sites and is not a cause for concern at this time. It is likely that as succession progresses, more conservative species will become established on the site.

The primary concern at this time for these sites is establishing (or finding evidence of) wetland hydrology. The ISGS will continue to monitor this site through Spring 2004. In order to confirm the accuracy of their data, they will survey well locations and site features using GPS and do a topographic survey for comparison to IDOT as-built plans. In addition, they will monitor the flow of water through onsite drainage ditches that allow water to flow from the site into the Edwards River. Blocking these outlets may allow wetland hydrology to become established at the site.

Soils at both sites have been seriously disturbed. Even so, the soils at the created wetland site do contain some hydric soil indicators, and therefore can be characterized as hydric. Soils at the wetland restoration site are very compacted and contain much gravel and rock. This may be a detriment to the establishment and survival of vegetation at the site. It may also impede the development of hydric soils at the site. Water will not be able to readily penetrate the site and will run off more quickly.

Literature Cited

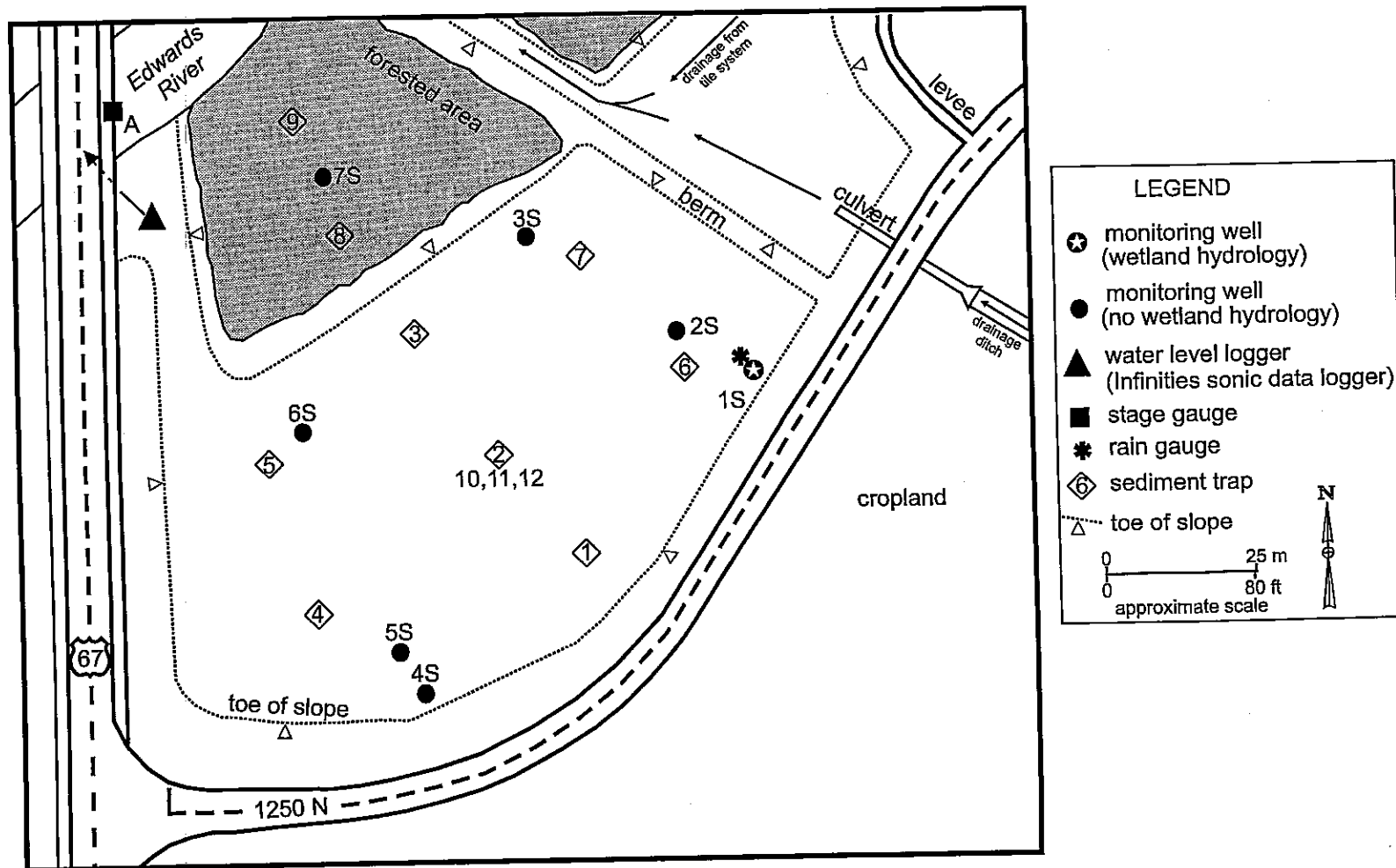
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- Taft, J. B., G.S. Wilhelm, D. M. Ladd, and L.A. Masters. 1997. Floristic quality assessment for vegetation in Illinois - a method for assessing vegetation integrity. *Erigenia* 15:3-95.
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Appendix A
Hydrologic Information

Edwards River, Mercer County Wetland Compensation Site (FAP 310)

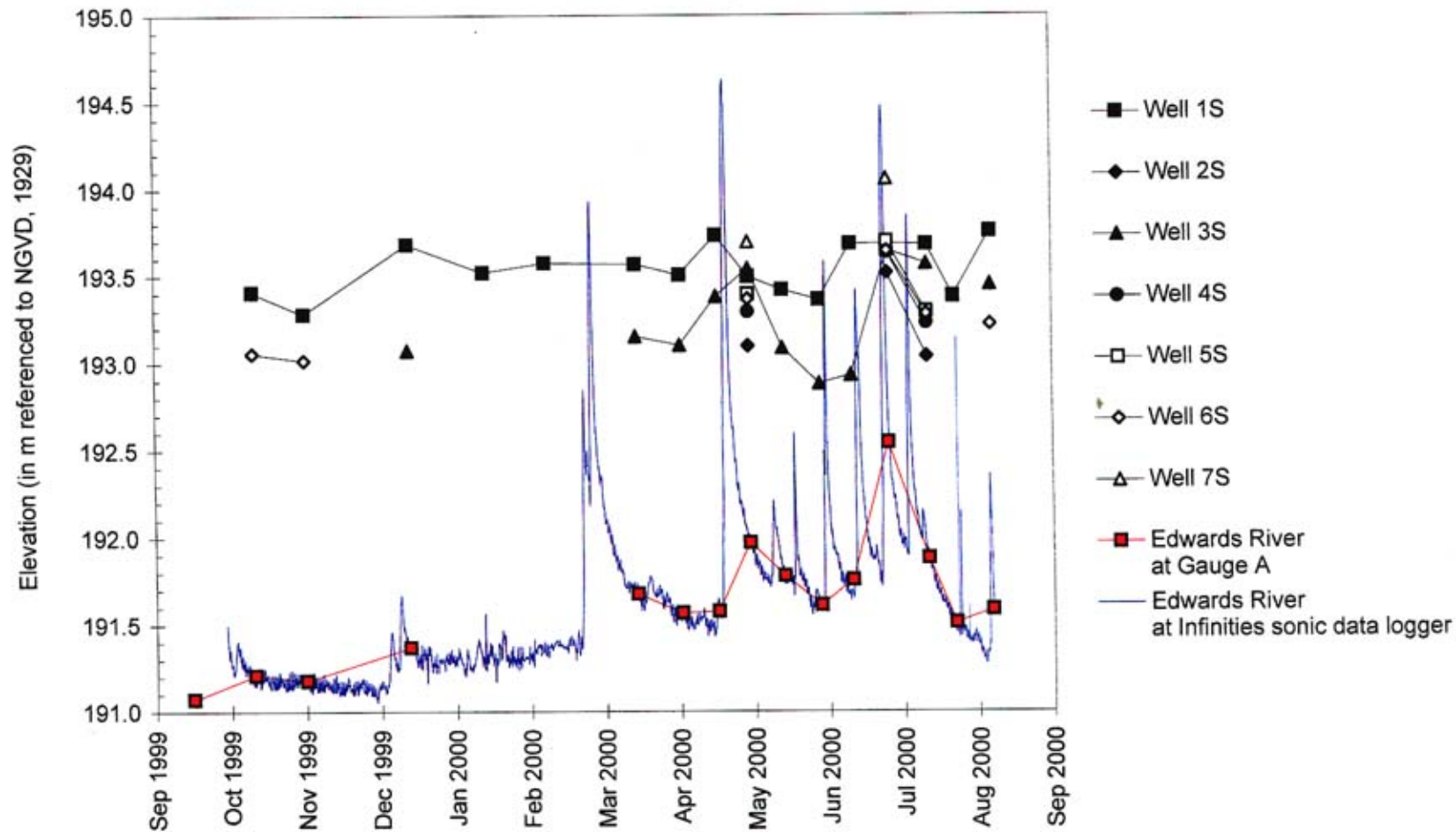
Approximate Locations of ISGS Monitoring Wells, Sediment Traps, Water-Level Logger and Stage Gauge

map based on unrectified aerial photography from IDOT (1998, NAPP 52-553) and an as-built survey



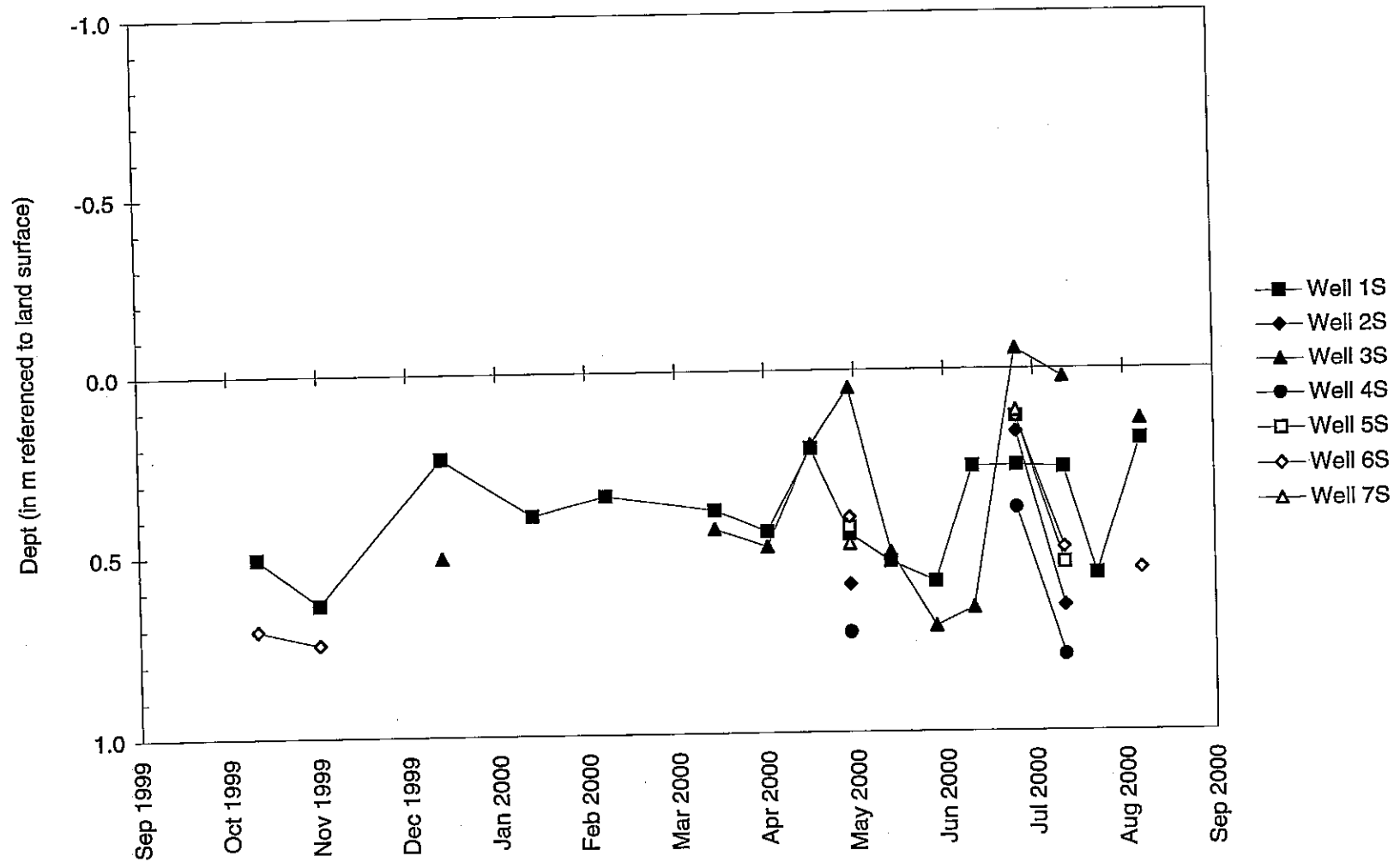
Edwards River, Mercer County Wetland Compensation Site September 1, 1999 to September 1, 2000

Water-Level Elevations



Edwards River, Mercer County Wetland Compensation Site September 1, 1999 to September 1, 2000

Depth to Water



Appendix B
Wetland Determination Forms

ROUTINE ONSITE WETLAND DETERMINATION

Site 1 (page 1 of 6)

Field Investigators: Feist, Coopridger, Tessene

Date: 16 August 2000

Project Name: FAP 310 (US 67)

Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2

State: Illinois

County: Mercer

Applicant: IDOT District 4

Site Name: Wetland creation

Legal Description: NE 1/4, SW 1/4, Sec. 35, T. 15 N., R. 2 W

Location: This wetland creation site is located 38.1 m (125 ft) south of the Edwards River and 15.2 m (50 ft) east of US 67.

Do normal environmental conditions exist at this site? Yes: X No:
Has the vegetation, soils, or hydrology been significantly disturbed? Yes: No: X

VEGETATION

Dominant Plant Species	Indicator Status	Stratum
1. <i>Bidens connata</i>	OBL	herb
2. <i>Leersia oryzoides</i>	OBL	herb

Percentage of dominant species that are OBL, FACW, FAC+, or FAC: 100%

Hydrophytic vegetation: Yes: X No:

Rationale: More than 50% of the dominants are OBL, FACW, FAC+, or FAC.

SOILS

Series and phase: Undetermined

On Mercer County hydric soils list? Yes: No: Undetermined: X

Is the soil a histosol? Yes: No: X Histic epipedon present? Yes: No: X

Redox concentrations: Yes: X No: Redox depletions: Yes: No: X

Matrix color: 2.5Y 5/1

Other indicators: This soil is found in a level to depressional area.

Hydric soils: Yes: X No:

Rationale: This soil surface has been altered somewhat because of cut and fill activities associated with an old roadbed. This soil meets the requirements of the Natural Resource Conservation Service hydric soil indicators F5 and F6, thick dark surface and redox dark surface, respectively.

ROUTINE ONSITE WETLAND DETERMINATION

Site 1 (page 2 of 6)

Field Investigators: Feist, Coopridger, Tessene

Date: 16 August 2000

Project Name: FAP 310 (US 67)

Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2

State: Illinois

County: Mercer

Applicant: IDOT District 4

Site Name: Wetland creation

Legal Description: NE 1/4, SW 1/4, Sec. 35, T. 15 N., R. 2 W

Location: This wetland creation site is located 38.1 m (125 ft) south of the Edwards River and 15.2 m (50 ft) east of US 67.

HYDROLOGY

Inundated: Yes: No: X

Depth of standing water: NA

Depth to saturated soil: > 1.2 m (48 in)

Overview of hydrological flow through the system: This site is hydrologically influenced by overflow from the Edwards River and by precipitation. Water leaves the site via evapotranspiration, sheet flow, and through a small drainage way on the northeast side leading into the nearby Edwards River.

Size of Watershed: 699 km² (270 mi²)

Other field evidence observed: This site is in a low area in the floodplain of a fairly large river. However, out of the seven wells placed at this site to monitor the water levels during the 2000 growing season, only one (1S) conclusively satisfied the wetland hydrology criteria (see Appendix A).

Wetland hydrology: Yes: No: X

Rationale: Water level data collected from the seven wells at the site indicate that this site is not inundated or saturated for a sufficient duration to satisfy the wetland hydrology criterion.

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: No: X

Rationale: Although dominant hydrophytic vegetation is present at the site, hydric soils and wetland hydrology are lacking; thus, we determined that this site is not a wetland. The NWI did not code this site as a wetland.

ROUTINE ONSITE WETLAND DETERMINATION

Site 1 (page 3 of 6)

Field Investigators: Feist, Coopridger, Tessene**Date:** 9 September 1999 **Project Name:** FAP 310 (US 67)**Section No.:** 104RS-2, (104)BR, (104-1)BR, 105RS-2**State:** Illinois **County:** Mercer **Applicant:** IDOT District 4**Site Name:** Wetland creation**Legal Description:** NE 1/4, SW 1/4, Sec. 35, T. 15 N., R. 2 W**Location:** This wetland creation site is located 38.1 m (125 ft) south of the Edwards River and 15.2 m (50 ft) east of US 67.

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	C†
<i>Acalypha rhomboidea</i>	three-seeded mercury	herb	FACU	0
<i>Acer negundo</i>	box elder	tree	FACW-	1
<i>Acer saccharinum</i>	silver maple	tree	FACW	1
<i>Agropyron repens</i>	quack grass	herb	FACU	*
<i>Ambrosia artemisiifolia</i>	common ragweed	herb	FACU	0
<i>Ambrosia trifida</i>	giant ragweed	herb	FAC+	0
<i>Asclepias incarnata</i>	swamp milkweed	herb	OBL	4
<i>Asclepias syriaca</i>	common milkweed	herb	UPL	0
<i>Aster pilosus</i>	hairy aster	herb	FACU+	0
<i>Aster simplex</i>	panicled aster	herb	FACW	3
<i>Bidens aristosa</i>	swamp marigold	herb	FACW	1
<i>Bidens cernua</i>	nodding beggar-ticks	herb	OBL	2
<i>Bidens connata</i>	purplestem beggar-ticks	herb	OBL	2
<i>Bidens frondosa</i>	common beggar-ticks	herb	FACW	1
<i>Bidens vulgata</i>	sticktight	herb	FACW	0
<i>Calystegia sepium</i>	American bindweed	herb	FAC	1
<i>Carex annectens</i>	large yellow fox sedge	herb	FACW	3
<i>Cirsium arvense</i>	Canada thistle	herb	FACU	*
<i>Conyza canadensis</i>	horseweed	herb	FAC-	0
<i>Coronilla varia</i>	crown vetch	herb	UPL	*
<i>Cyperus esculentus</i>	yellow nut-sedge	herb	FACW	0
<i>Cyperus strigosus</i>	straw colored flatsedge	herb	FACW	0
<i>Echinochloa muricata</i>	barnyard grass	herb	OBL	0
<i>Eupatorium altissimum</i>	tall boneset	herb	FACU	1
<i>Eupatorium serotinum</i>	late boneset	herb	FAC+	1
<i>Gaura biennis</i>	butterfly-weed	herb	FACU-	2
<i>Geum laciniatum</i>	rough avens	herb	FACW	2
<i>Hordeum jubatum</i>	squirrel-tail	herb	FAC+	*

Species list continued on next page.

ROUTINE ONSITE WETLAND DETERMINATION

Site 1 (page 4 of 6)

Field Investigators: Feist, Coopridger, Tessene**Date:** 16 August 2000 **Project Name:** FAP 310 (US 67)**Section No.:** 104RS-2, (104)BR, (104-1)BR, 105RS-2**State:** Illinois **County:** Mercer **Applicant:** IDOT District 4**Site Name:** Wetland creation**Legal Description:** NE 1/4, SW 1/4, Sec. 35, T. 15 N., R. 2 W**Location:** This wetland creation site is located 38.1 m (125 ft) south of the Edwards River and 15.2 m (50 ft) east of US 67.SPECIES LIST *continued*

Scientific name	Common name	Stratum	Wetland indicator status	C†
<i>Lactuca serriola</i>	compass plant	herb	FAC	*
<i>Leersia oryzoides</i>	rice cutgrass	herb	OBL	3
<i>Lobelia siphilitica</i>	blue cardinal-flower	herb	FACW+	4
<i>Lotus corniculatus</i>	birdsfoot-trefoil	herb	FAC-	*
<i>Lycopus americanus</i>	common water horehound	herb	OBL	3
<i>Melilotus alba</i>	white sweet clover	herb	FACU	*
<i>Mentha arvensis villosa</i>	field mint	herb	FACW	4
<i>Oenothera biennis</i>	evening primrose	herb	FACU	1
<i>Oxalis dillenii</i>	yellow wood sorrel	herb	FACU	0
<i>Phalaris arundinacea</i>	reed canary grass	herb	FACW+	*
<i>Physalis virginiana</i>	ground cherry	herb	UPL	3
<i>Pilea pumila</i>	Canada clearweed	herb	FACW	3
<i>Polygonum amphibium</i>	water smartweed	herb	OBL	3
<i>Polygonum aviculare</i>	knotweed	herb	FAC-	*
<i>Polygonum hydropiper</i>	water pepper	herb	OBL	*
<i>Polygonum lapathifolium</i>	curttop lady's thumb	herb	FACW+	0
<i>Polygonum pensylvanicum</i>	giant smartweed	herb	FACW+	1
<i>Polygonum persicaria</i>	spotted lady's thumb	herb	FACW	*
<i>Polygonum punctatum</i>	dotted smartweed	herb	OBL	3
<i>Polygonum scandens</i>	climbing buckwheat	herb	FAC	2
<i>Populus deltoides</i>	eastern cottonwood	tree	FAC+	2
<i>Potentilla norvegica</i>	rough cinquefoil	herb	FAC	0
<i>Rorippa islandica</i>	marsh yellow cress	herb	OBL	4
<i>Rudbeckia laciniata</i>	cut-leaf coneflower	herb	FACW+	3
<i>Rumex altissimus</i>	pale dock	herb	FACW-	2
<i>Rumex crispus</i>	curly dock	herb	FAC+	*
<i>Salix exigua</i>	sandbar willow	shrub	OBL	1
<i>Salix nigra</i>	black willow	tree	OBL	3
<i>Scirpus atrovirens</i>	dark green bulrush	herb	OBL	4

Species list continued on next page.

ROUTINE ONSITE WETLAND DETERMINATION

Site 1 (page 5 of 6)

Field Investigators: Feist, Coopridger, Tessene**Date:** 16 August 2000**Project Name:** FAP 310 (US 67)**Section No.:** 104RS-2, (104)BR, (104-1)BR, 105RS-2**State:** Illinois**County:** Mercer**Applicant:** IDOT District 4**Site Name:** Wetland creation**Legal Description:** NE 1/4, SW 1/4, Sec. 35, T. 15 N., R. 2 W**Location:** This wetland creation site is located 38.1 m (125 ft) south of the Edwards River and 15.2 m (50 ft) east of US 67.SPECIES LIST *continued*

Scientific name	Common name	Stratum	Wetland indicator status	C†
<i>Scutellaria lateriflora</i>	mad-dog skullcap	herb	OBL	4
<i>Setaria faberi</i>	giant foxtail	herb	FACU+	*
<i>Setaria glauca</i>	pigeon grass	herb	FAC	*
<i>Setaria viridis</i>	common foxtail	herb	UPL	*
<i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1
<i>Solidago gigantea</i>	late goldenrod	herb	FACW	3
<i>Trifolium hybridum</i>	alsike clover	herb	FAC-	*
<i>Typha latifolia</i>	cattail	herb	OBL	1
<i>Urtica dioica</i>	stinging nettle	herb	FAC+	2
<i>Verbena hastata</i>	blue vervain	herb	FACW+	3
<i>Verbena urticifolia</i>	white vervian	herb	FAC+	3
<i>Xanthium strumarium</i>	cocklebur	herb	FAC	0

†Coefficient of Conservatism (Taft et al. 1997)

*Non-native species

$$\bar{C} = \sum C/N = 91/53 = 1.7$$

$$FQI = \bar{C} (\sqrt{N}) = 1.7 (\sqrt{53}) = 12.4$$

PLANTED TREES

Scientific name	Common name	Stratum	Wetland indicator status	C†
<i>Quercus palustris</i>	pin oak	tree	FACW	4
<i>Quercus bicolor</i>	swamp white oak	tree	FACW+	7
<i>Betula nigra</i>	red birch	tree	FACW	4

†Coefficient of Conservatism (Taft et al. 1997)

*Non-native species

**These calculations include the complete species list above, as well as the planted trees.

$$\bar{C} = \sum C/N = 106/57 = 1.9$$

$$FQI = \bar{C} (\sqrt{N}) = 1.9 (\sqrt{57}) = 14.3$$

ROUTINE ONSITE WETLAND DETERMINATION

Site 1 (page 6 of 6)

Field Investigators: Feist, Coopriders, Tessene

Date: 16 August 2000

Project Name: FAP 310 (US 67)

Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2

State: Illinois

County: Mercer

Applicant: IDOT District 4

Site Name: Wetland creation

Legal Description: NE 1/4, SW 1/4, Sec. 35, T. 15 N., R. 2 W

Location: This wetland creation site is located 38.1 m (125 ft) south of the Edwards River and 15.2 m (50 ft) east of US 67.

Determined by: Mary Ann Feist and Paul Tessene
(vegetation and hydrology)

Mary Coopriders

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Illinois State Geological Survey

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ROUTINE ONSITE WETLAND DETERMINATION

Site 2 (page 1 of 5)

Field Investigators: Feist, Coopridger, Tessene

Date: 16 August 2000

Project Name: FAP 310 (US 67)

Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2

State: Illinois **County:** Mercer **Applicant:** IDOT District 4

Site Name: Wetland restoration

Legal Description: SE 1/4, NW 1/4, Sec. 35, T. 15 N., R. 2 W

Location: This wetland restoration site is located just north of the Edwards River and just east of US 67.

Do normal environmental conditions exist at this site? Yes: X No:
Has the vegetation, soils, or hydrology been significantly disturbed? Yes: No: X

VEGETATION

Dominant Plant Species	Indicator Status	Stratum
1. <i>Aster ontarionis</i>	FAC	herb
2. <i>Bidens connata</i>	OBL	herb
3. <i>Melilotus officinalis</i>	FACU	herb

Percentage of dominant species that are OBL, FACW, FAC+, or FAC: 67%

Hydrophytic vegetation: Yes: X No:

Rationale: Less than 50% of the dominants are OBL, FACW, FAC+, or FAC.

SOILS

Series and phase: Undetermined

On Mercer County hydric soils list? Yes: No: Undetermined: X

Is the soil a histosol? Yes: No: X Histic epipedon present? Yes: No: X

Redox concentrations: Yes: No: Undet: X

Redox depletions: Yes: No: Undet: X

Matrix color: NA

Other indicators: None

Hydric soils: Yes: No: Undetermined: X

Rationale: This soil has been altered because of cut and fill activities used in building the road and bridge. The site was severely compacted and contained rock and gravel. Penetration of the soil surface was nearly impossible. Soil colors of this material would not reflect the true soil genesis at this site.

ROUTINE ONSITE WETLAND DETERMINATION
Site 2 (page 2 of 5)

Field Investigators: Feist, Coopridger, Tessene
Date: 16 August 2000 **Project Name:** FAP 310 (US 67)
Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2
State: Illinois **County:** Mercer **Applicant:** IDOT District 4
Site Name: Wetland restoration
Legal Description: SE 1/4, NW 1/4, Sec. 35, T. 15 N., R. 2 W
Location: This wetland restoration site is located just north of the Edwards River and just east of US 67.

HYDROLOGY

Inundated: Yes: No: X Depth of standing water: NA

Depth to saturated soil: NA

Overview of hydrological flow through the system: This site is hydrologically influenced by precipitation and overflow from the Edwards River. Water leaves the site via evapotranspiration and sheet flow into the adjacent Edwards River.

Size of Watershed: 699 km² (270 mi²)

Other field evidence observed: None

Wetland hydrology: Yes: No: Undetermined: X

Rationale: No indicators of wetland hydrology were observed, however, this site was disturbed within the last year by construction activities and tree plantings. The position of this site between the Edwards River and a levee, suggests that the area floods for some period of time each year. At this time, it is uncertain as to whether this site is inundated or saturated for a sufficient duration to satisfy the wetland hydrology criterion.

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: No: X

Rationale: Although dominant hydrophytic vegetation is present at the site, hydric soils and wetland hydrology are lacking or undetermined at this time; thus, we determined that this site is currently not a wetland. The NWI coded this site as a temporarily flooded, broad-leaved deciduous, forested, palustrine wetland (PFO1A).

ROUTINE ONSITE WETLAND DETERMINATION

Site 2 (page 3 of 5)

Field Investigators: Feist, Coopriders, Tessene

Date: 16 August 2000

Project Name: FAP 310 (US 67)

Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2

State: Illinois **County:** Mercer **Applicant:** IDOT District 4

Site Name: Wetland restoration

Legal Description: SE 1/4, NW 1/4, Sec. 35, T. 15 N., R. 2 W

Location: This wetland restoration site is located just north of the Edwards River and just east of US 67.

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	Ct
<i>Acalypha rhomboidea</i>	three-seeded mercury	herb	FACU	0
<i>Acer saccharinum</i>	silver maple	herb	FACW	1
<i>Acer negundo</i>	box elder	tree	FACW-	1
<i>Ambrosia artemisiifolia</i>	bitterweed	herb	FACU	0
<i>Ambrosia trifida</i>	giant ragweed	herb	FAC+	0
<i>Aster ontarionis</i>	Ontario aster	herb	FAC	4
<i>Aster pilosus</i>	hairy aster	herb	FACU+	0
<i>Aster simplex</i>	panicled aster	herb	FACW	3
<i>Bidens aristosa</i>	swamp marigold	herb	FACW	1
<i>Bidens cernua</i>	nodding beggar-ticks	herb	OBL	2
<i>Bidens connata</i>	purplestem beggar-ticks	herb	OBL	2
<i>Bidens frondosa</i>	common beggar-ticks	herb	FACW	1
<i>Calystegia sepium</i>	American bindweed	herb	FAC	1
<i>Campanula americana</i>	American bellflower	herb	FAC	4
<i>Carex frankii</i>	sedge	herb	OBL	4
<i>Carex vulpinoidea</i>	fox sedge	herb	OBL	3
<i>Cinna arundinacea</i>	stout wood reed	herb	FACW	5
<i>Cirsium vulgare</i>	bull thistle	herb	FACU-	*
<i>Conium maculatum</i>	poison hemlock	herb	FACW	*
<i>Conyza canadensis</i>	horseweed	herb	FAC-	0
<i>Cryptotaenia canadensis</i>	honestwort	herb	FAC	1
<i>Daucus carota</i>	Queen-Anne's-lace	herb	UPL	*
<i>Echinochloa muricata</i>	barnyard grass	herb	OBL	0
<i>Elymus virginicus</i>	Virginia wild rye	herb	FACW-	4
<i>Epilobium coloratum</i>	cinnamon willow herb	herb	OBL	3
<i>Eupatorium perfoliatum</i>	common boneset	herb	FACW+	4
<i>Eupatorium serotinum</i>	late boneset	herb	FAC+	1
<i>Helenium autumnale</i>	sneezeweed	herb	FACW+	3
<i>Helianthus tuberosus</i>	Jerusalem artichoke	herb	FAC	3
<i>Impatiens capensis</i>	jewelweed	herb	FACW	2
<i>Lactuca serriola</i>	prickly lettuce	herb	FAC	*

Species list continued on the next page.

ROUTINE ONSITE WETLAND DETERMINATION

Site 2 (page 4 of 5)

Field Investigators: Feist, Coopridger, Tessene

Date: 16 August 2000 **Project Name:** FAP 310 (US 67)

Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2

State: Illinois **County:** Mercer **Applicant:** IDOT District 4

Site Name: Wetland restoration

Legal Description: SE 1/4, NW 1/4, Sec. 35, T. 15 N., R. 2 W

Location: This wetland restoration site is located just north of the Edwards River and just east of US 67.

SPECIES LIST *continued*

Scientific name	Common name	Stratum	Wetland indicator status	Ct
<i>Laportea canadensis</i>	wood nettle	herb	FACW	2
<i>Leersia oryzoides</i>	rice cutgrass	herb	OBL	3
<i>Leersia virginica</i>	white grass	herb	FACW	4
<i>Lobelia siphilitica</i>	blue cardinal-flower	herb	FACW+	4
<i>Lycopus americanus</i>	common water horehound	herb	OBL	3
<i>Melilotus officinalis</i>	yellow sweet clover	herb	FACU	*
<i>Mentha arvensis villosa</i>	field mint	herb	FACW	4
<i>Muhlenbergia frondosa</i>	common satin grass	herb	FACW	3
<i>Oenothera biennis</i>	evening primrose	herb	FACU	1
<i>Oxalis stricta</i>	yellow wood sorrel	herb	FACU	0
<i>Penthorum sedoides</i>	ditch stonecrop	herb	OBL	2
<i>Phalaris arundinacea</i>	reed canary grass	herb	FACW+	*
<i>Pilea pumila</i>	Canada clearweed	herb	FACW	3
<i>Polygonum lapathifolium</i>	curttop lady's thumb	herb	FACW+	0
<i>Polygonum pensylvanicum</i>	giant smartweed	herb	FACW+	1
<i>Polygonum scandens</i>	climbing buckwheat	herb	FAC	2
<i>Populus deltoides</i>	eastern cottonwood	shrub, herb	FAC+	2
<i>Potentilla norvegica</i>	rough cinquefoil	herb	FAC	0
<i>Rorippa islandica fernaldiana</i>	marsh yellow cress	herb	OBL	4
<i>Rudbeckia laciniata</i>	cut-leaf coneflower	herb	FACW+	3
<i>Rumex altissimus</i>	pale dock	herb	FACW-	2
<i>Rumex crispus</i>	curly dock	herb	FAC+	*
<i>Salix exigua</i>	sandbar willow	shrub	OBL	1
<i>Sambucus canadensis</i>	common elder	shrub	FACW-	2
<i>Setaria faberi</i>	giant foxtail	herb	FACU+	*
<i>Setaria glauca</i>	pigeon grass	herb	FAC	*
<i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1
<i>Solidago gigantea</i>	late goldenrod	herb	FACW	3
<i>Ulmus americana</i>	American elm	shrub	FACW-	5

Species list continued on next page.

ROUTINE ONSITE WETLAND DETERMINATION

Site 2 (page 5 of 5)

Field Investigators: Feist, Coopridger, Tessene

Date: 16 August 2000

Project Name: FAP 310 (US 67)

Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2

State: Illinois

County: Mercer

Applicant: IDOT District 4

Site Name: Wetland restoration

Legal Description: SE 1/4, NW 1/4, Sec. 35, T. 15 N., R. 2 W

Location: This wetland restoration site is located just north of the Edwards River and just east of US 67.

SPECIES LIST *continued*

Scientific name	Common name	Stratum	Wetland indicator status	C†
<i>Verbena hastata</i>	blue vervain	herb	FACW+	3
<i>Verbena urticifolia</i>	white vervain	herb	FAC+	3
<i>Vitis riparia</i>	riverbank grape	woody vine	FACW-	2
<i>Xanthium strumarium</i>	cocklebur	herb	FAC	0

†Coefficient of Conservatism (Taft et al. 1997)

*Non-native species

$$\bar{C} = \Sigma C/N = 116/55 = 2.1$$

$$FQI = \bar{C} (\sqrt{N}) = 2.1 (\sqrt{55}) = 15.6$$

PLANTED TREES

Scientific name	Common name	Stratum	Wetland indicator status	C†
<i>Quercus palustris</i>	pin oak	shrub	FACW	4
<i>Quercus bicolor</i>	swamp white oak	shrub	FACW+	7
<i>Betula nigra</i>	red birch	shrub	FACW	4
<i>Acer rubrum</i>	red maple	shrub	FAC	5

†Coefficient of Conservatism (Taft et al. 1997)

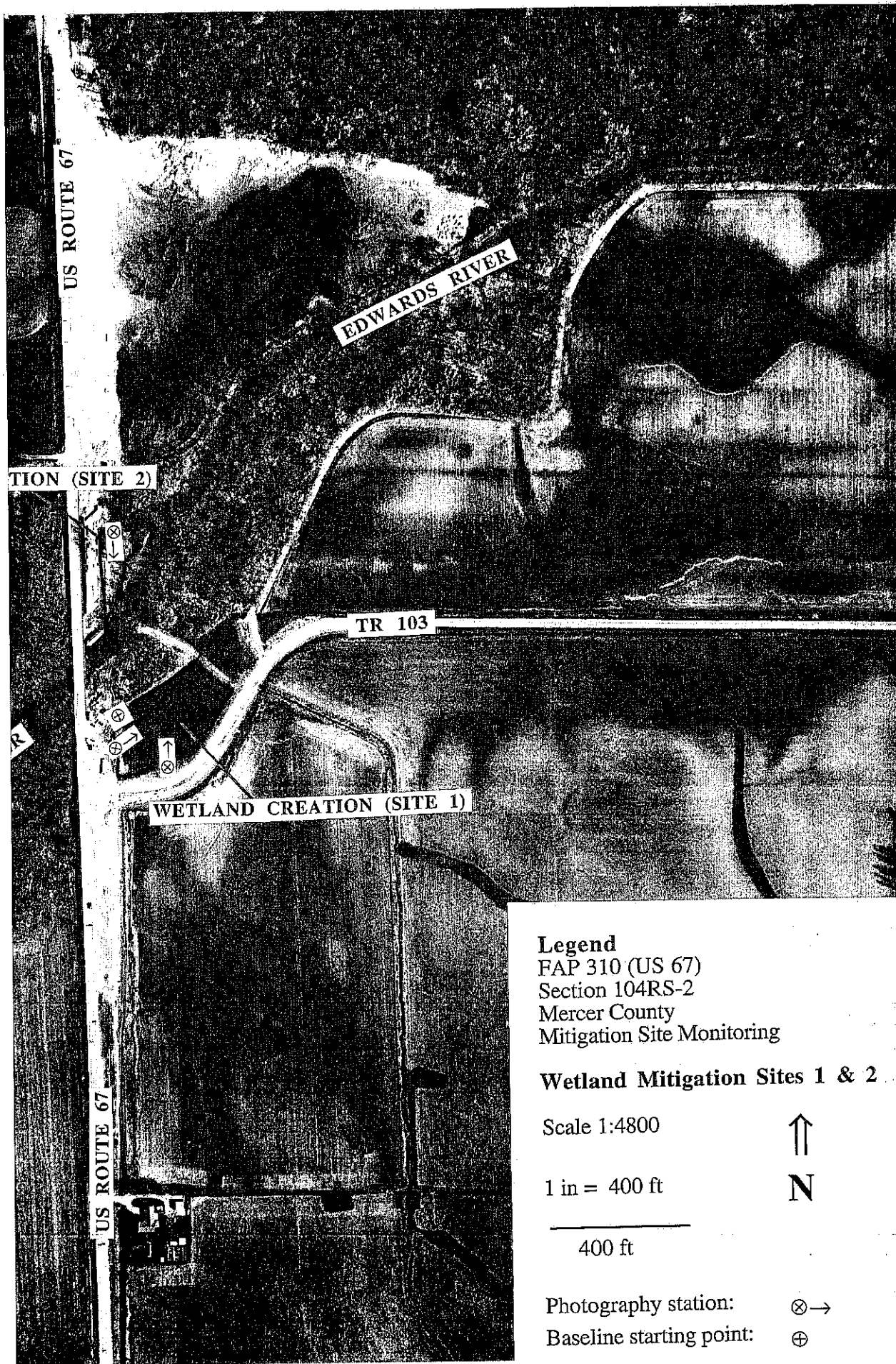
*Non-native species

$$\bar{C} = \Sigma C/N = 136/59 = 2.3$$

$$FQI = \bar{C} (\sqrt{N}) = 2.3 (\sqrt{59}) = 17.7$$

**These calculations include the complete species list above, as well as the planted trees.

Determined by: Mary Ann Feist and Paul Tessene
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 (soils and hydrology)
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Appendix C
Photographs of Wetland Mitigation Sites



Photostation 1. View of wetland creation (site 1) looking northeast.



Photostation 2. View of wetland creation (site 1) looking north.



Photostation 3. View of wetland restoration (site 2) looking south.